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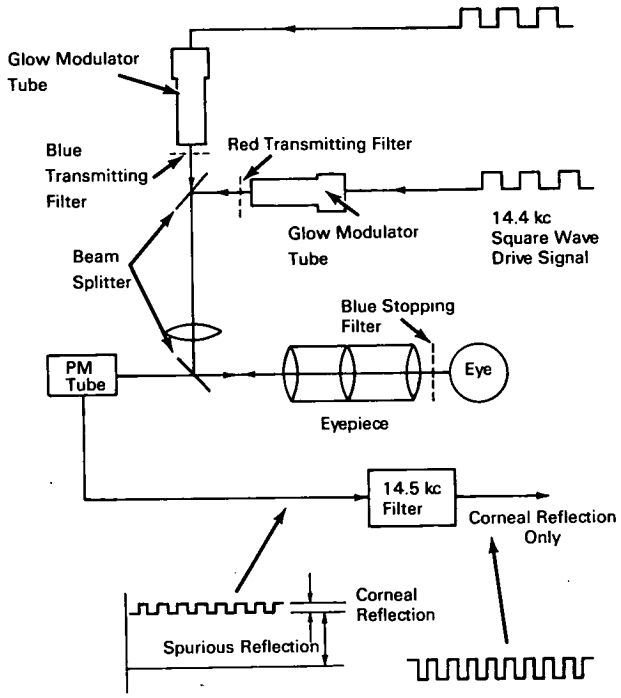
NASA TECH BRIEF

Electronic Filter Discriminates between True and False Reflections



The problem:

In the testing of a newly designed oculometer, it was found that spurious reflections of the CRT light were formed by the air-glass surfaces of the eyepiece and beam splitters. Antireflection coatings applied to the lenses did not resolve the problem. The magnitude of the reflection problem required that a means of discriminating true from false reflections be provided, rather than make further attempts to reduce the intensity of the spurious reflections.

The solution:

An electronic filtering system that chops the true corneal reflection so that it can be discriminated from false reflections.

How it's done:

The CRT spot is replaced by two glow modulator tubes which are arranged, with a beam splitter, so that the images of the two bright spots of light produced by these tubes are projected coincidently into the oculometer. Blue transmitting and red transmitting filters are placed near the tubes as shown. Each tube is switched on and off at a 14.4 kc rate in such a way that when one is on, the other is off. The result is that the color of the light being projected into the oculometer (to form a corneal reflection) is switched from red to blue 14,400 times per second. The relative intensity of the red and blue tubes is adjusted so that the spurious reflections are of equal intensity for

(continued overleaf)

both lamps. This causes the 14.4 kc component in the PM tube output, due to spurious reflections, to be zero. A blue stopping filter is placed between the eye and the eyepiece. This filter causes the corneal reflection to be modulated at 14.4 kc because only light from the red lamp can reach the eye and return to the PM tube. The true corneal reflection signal can thus be discriminated from the spurious reflections by a bandpass filter centered at 14.4 kc.

Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Headquarters
National Aeronautics and Space Administration
Washington, D.C. 20546
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Patent status:

No patent action is contemplated by NASA.

Source: John Merchant
of Honeywell Inc.
under contract to
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(HQ-55)